

# The Kepler Transit Demonstration

The Kepler Transit Demonstration illustrates how the Kepler science team will discover Earth-size planets around other stars by the transit method with the Kepler satellite photometer.

This document, along with LEGO Orrery parts list and instructions can be downloaded from the Kepler Education website — <http://kepler.nasa.gov/kepler/ed>

## Components:

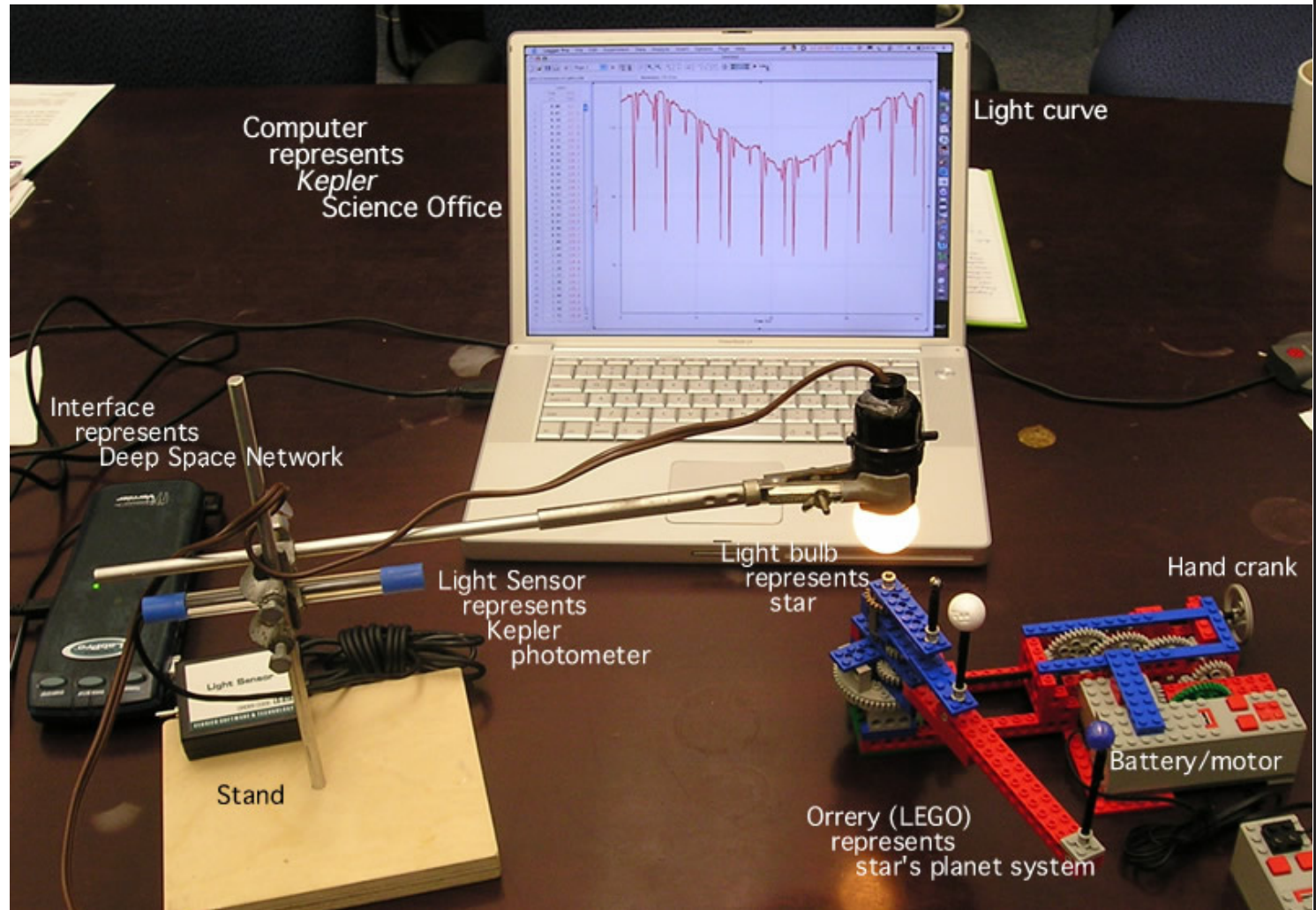
A LEGO-orrrery model represents a planet system that can be set in motion with either a hand crank or electric motor.

A light bulb at the center of the orrrery represents the star.

A light sensor represents the Kepler spacecraft photometer.

The light sensor is connected through an interface box (which represents NASA Deep Space Network) to...

A computer that represents the Kepler Science Office.



## Sources of components:

From **Vernier Software and Technology** <http://www.vernier.com/>

Interface: Go! Link \$59.00 (Sep 2004)

Light Sensor LS-BTA \$45.00 (Sep 2004)

Software: Logger Pro 3 [LP] \$149 (Sep 2004)  
for PC and Mac

[you can also download free demo version]

From a **science company**, e.g. Science Kit  
<http://www.sciencekit.com/>

Metal Base (10cm x 15cm) with Rod

Size (8mm dia x 46mm long) \$8.95

WW6308001

Buret Clamp Plain jaws \$7.60 WW6107500

Plastic jaws \$8.75 WW6108000,  
adjustable, to hold light sensor

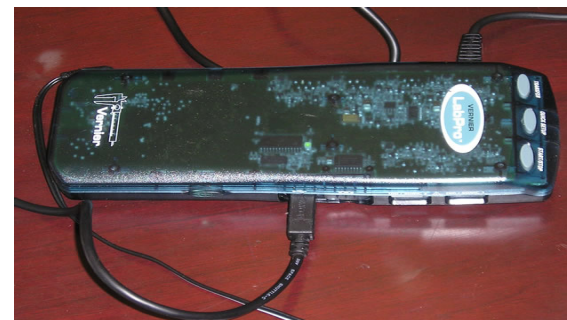
Right Angle Clamp Holder - (6112000) \$7.95  
(to hold horizontal rod for clamp on utility  
light)

Clamp On Utility Light \$11.90 WW4639500

From a **hardware store**

Light bulb, 7.5W, medium standard base,  
about 1.3" dia.

An extra metal rod as a horizontal support for  
clamp on utility light

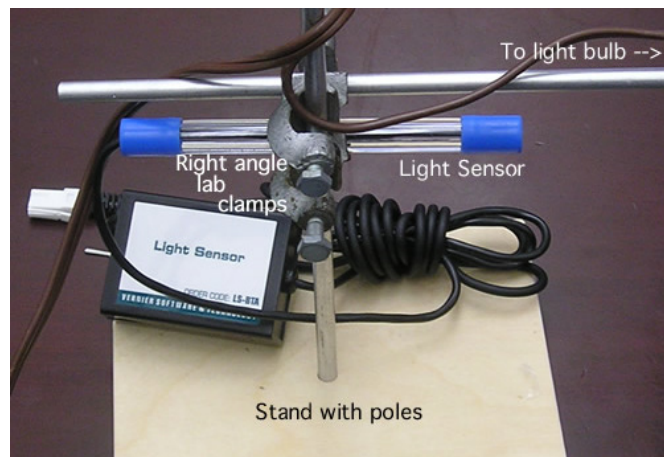


Interface shown here  
is for 4 inputs. The  
Go! Link unit is all that  
is needed for 1 input.



Plug connects to  
interface unit

Light Sensor  
represents  
Kepler  
photometer

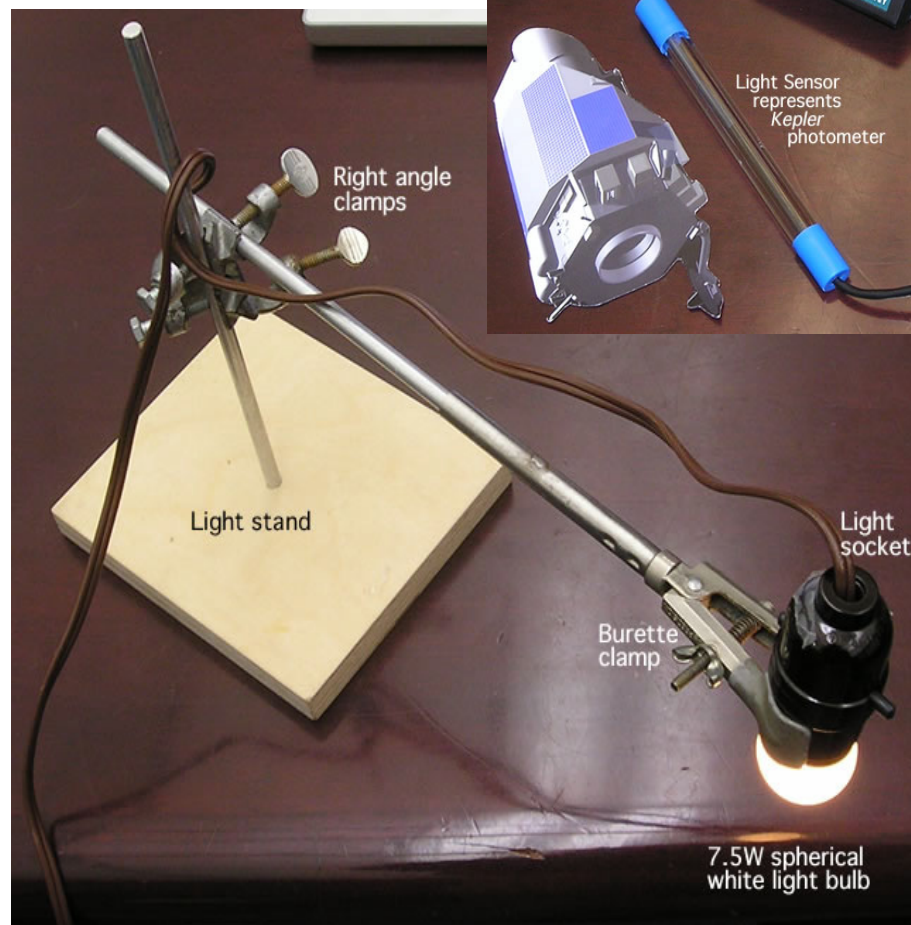


To light bulb -->

Right angle  
lab  
clamps

Light Sensor

Stand with poles



Right angle  
clamps

Light stand

Burette  
clamp

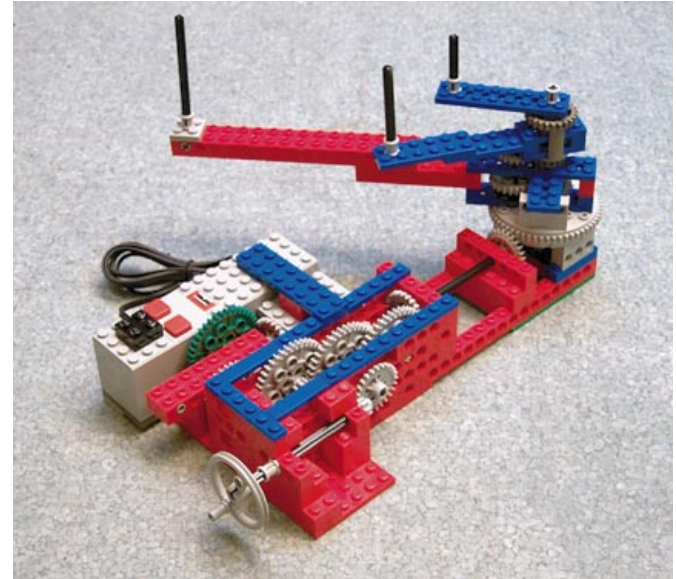
Light  
socket

7.5W spherical  
white light bulb



# LEGO orrery assembly instructions

7/9/04



## Uses the following kits from LEGO Education

Available online at <http://www.legoeducationstore.com/>

<b>W979649</b>	<b>LEGO Technology Resource Set</b>
<b>W779876</b>	<b>LEGO Large Turntable (set of 2)</b>
<b>W979615</b>	<b>LEGO 9V motor and battery box set</b>

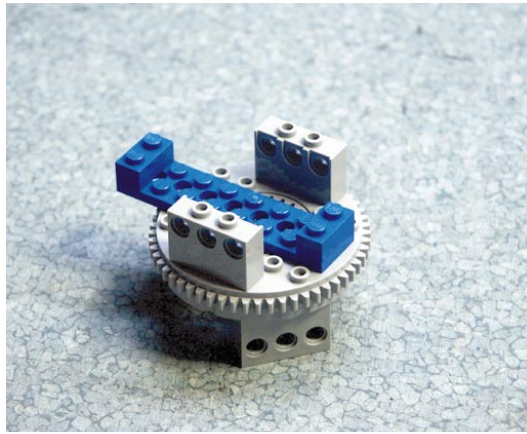
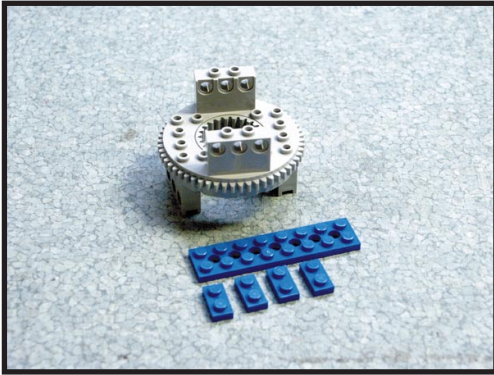
(W979649 and W779876 include enough parts to make two complete non-motorized models.)

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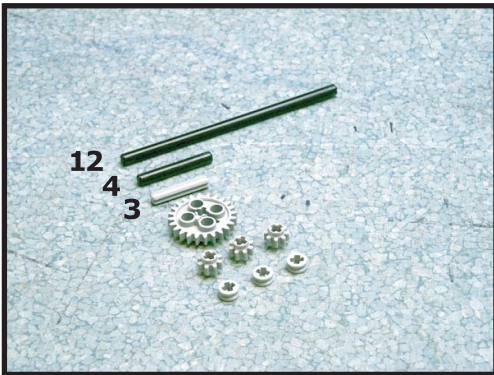
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1



2



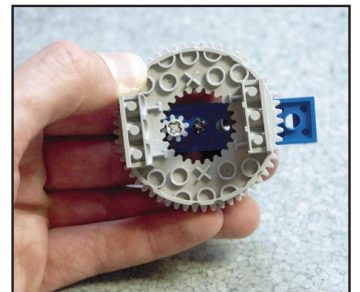
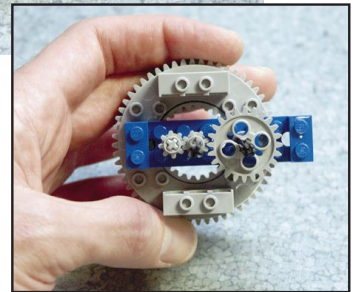
a



b

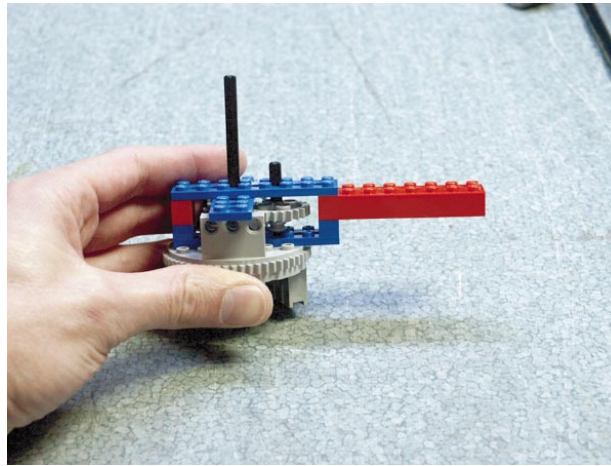
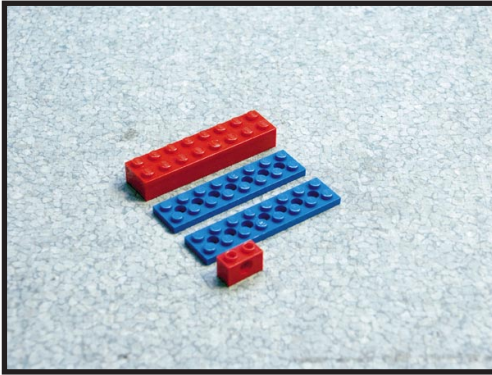


c

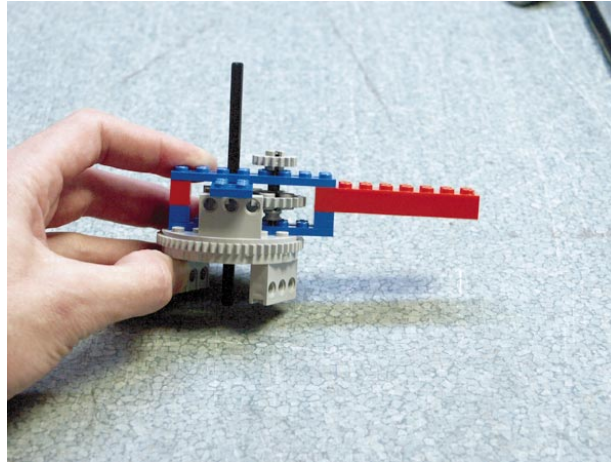




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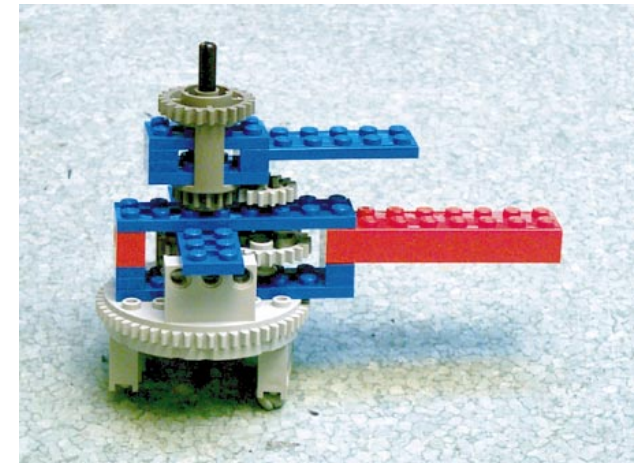


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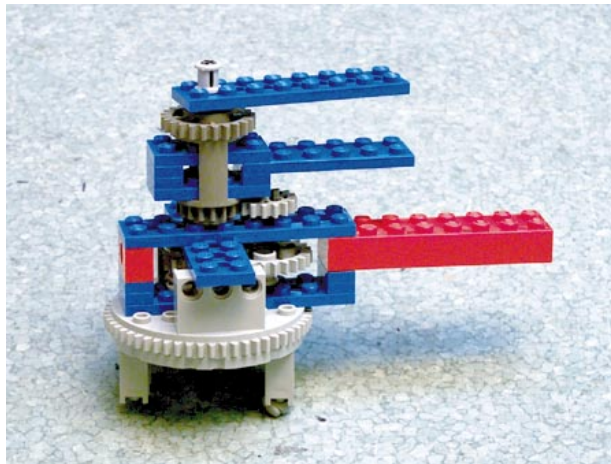
Note: Don't push this gear all the way down on the shaft. (If it's pushed down too far, it will bind with the blue piece.)

5

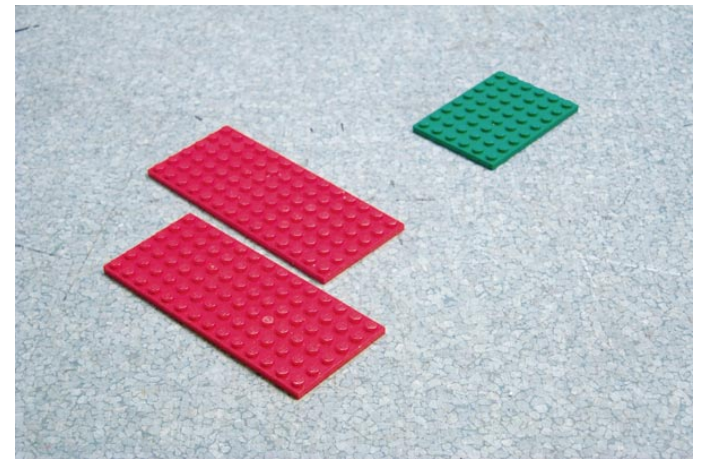
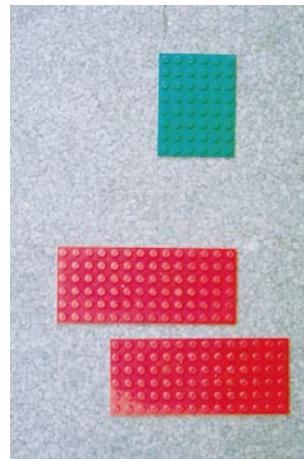
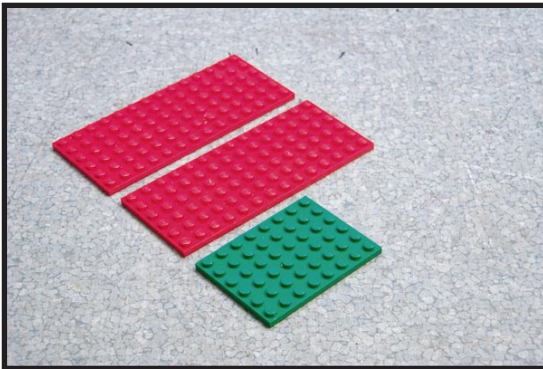




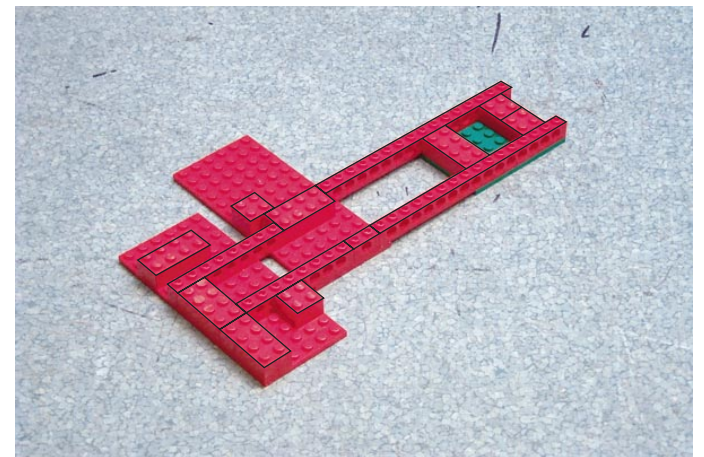
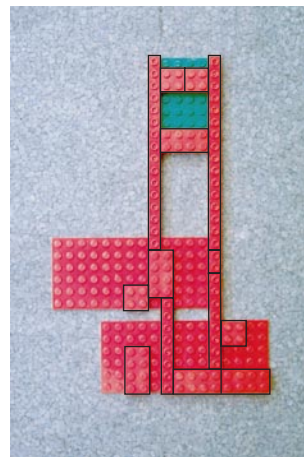
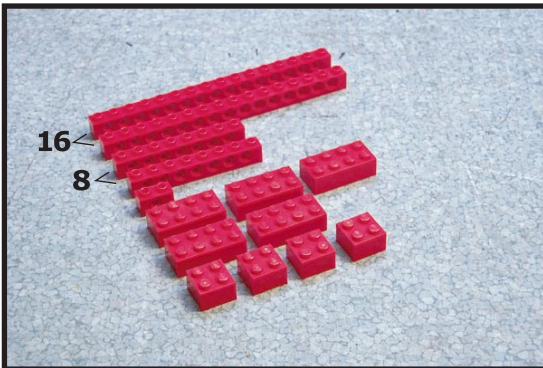
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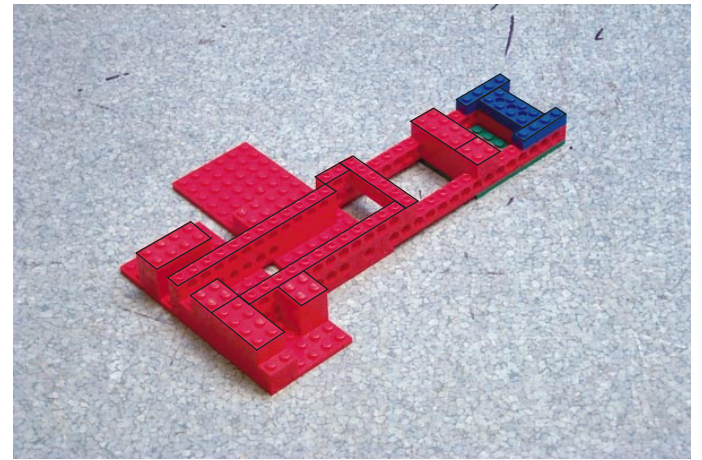
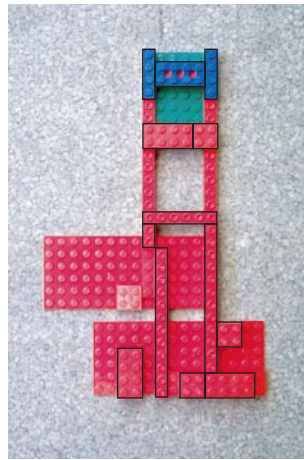
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8

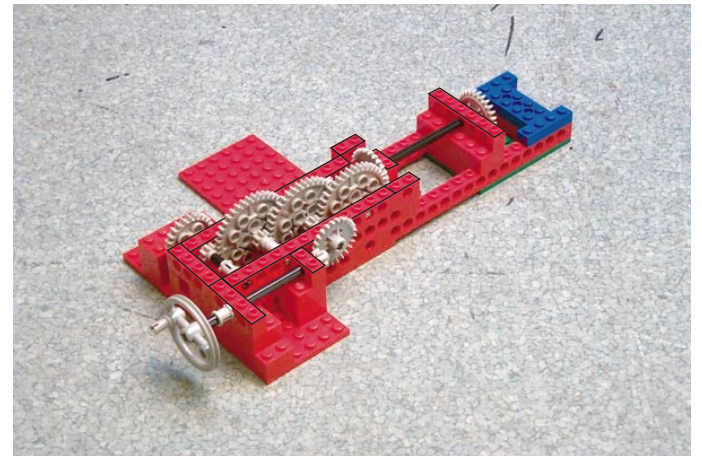
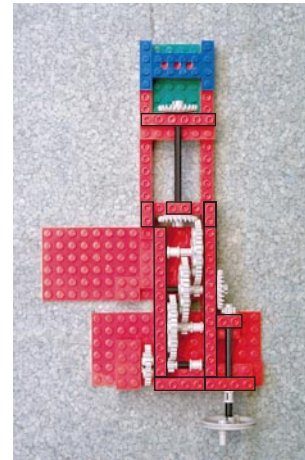






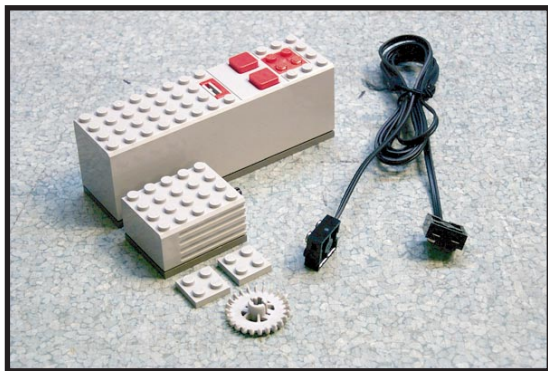
A collection of mechanical parts, including gears, shafts, and bearings, arranged on a light-colored surface. The parts are labeled with numbers 1 through 12, indicating their respective quantities or types. The parts include:

- 12 red plastic gears (labeled 12)
- 6 black plastic gears (labeled 6)
- 10 black plastic gears (labeled 10)
- 6 black plastic gears (labeled 6)
- 5 black plastic gears (labeled 5)
- Various sizes of metal gears and shafts.
- Various sizes of metal bearings and rollers.





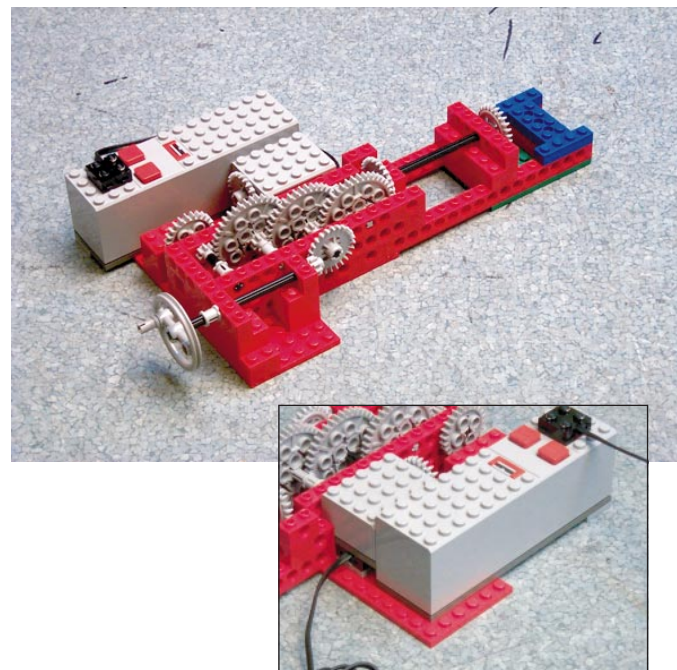
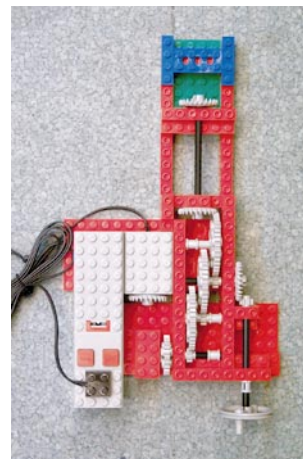
11



a

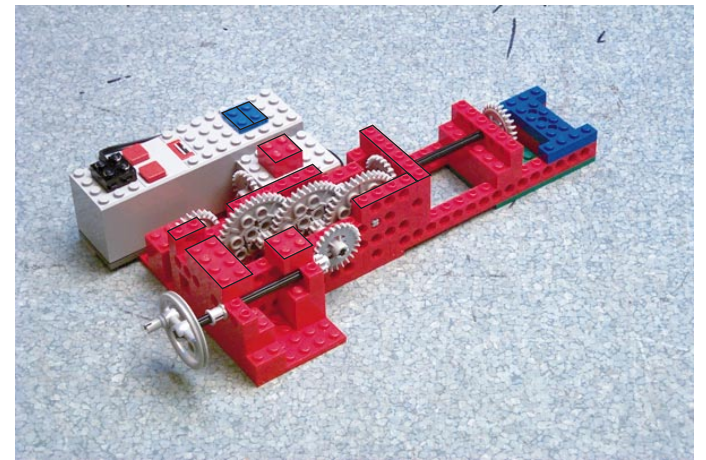
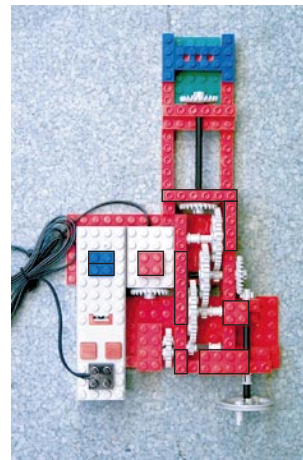
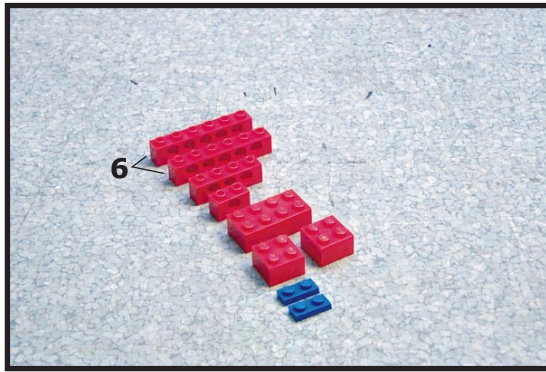


b

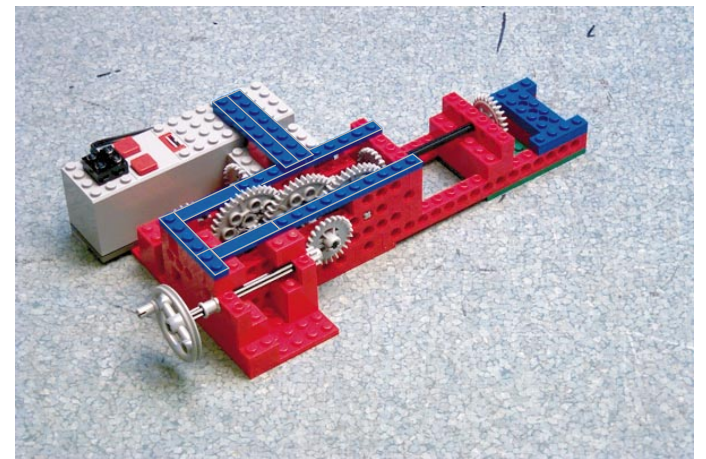
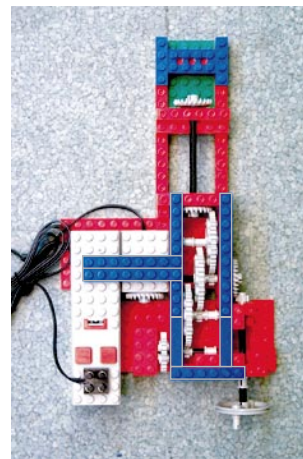
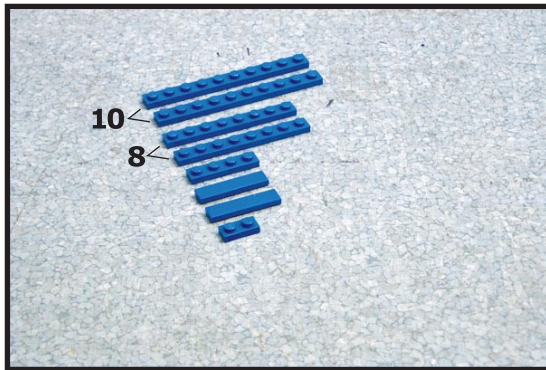




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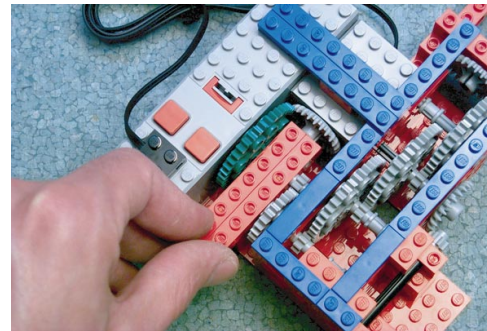
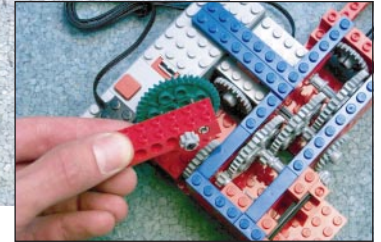
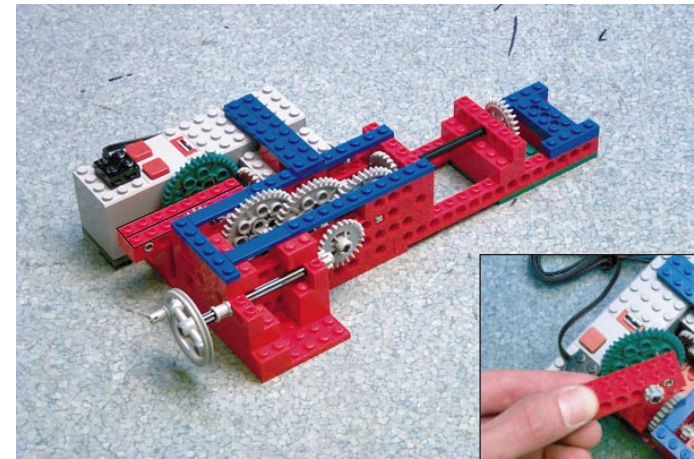
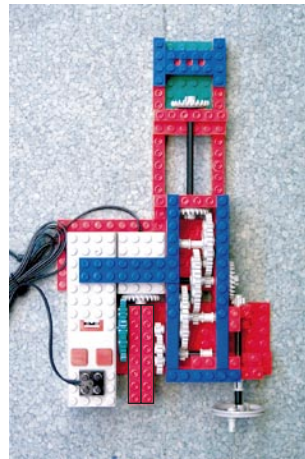
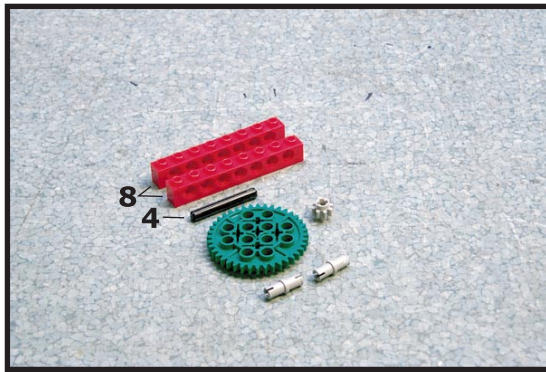


13

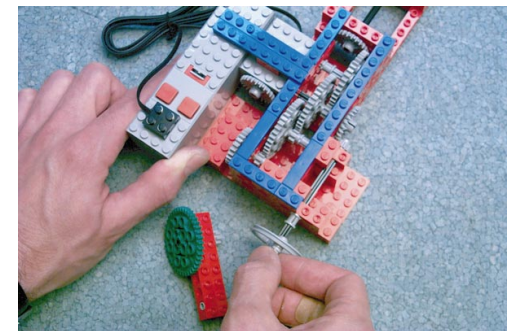




# 14

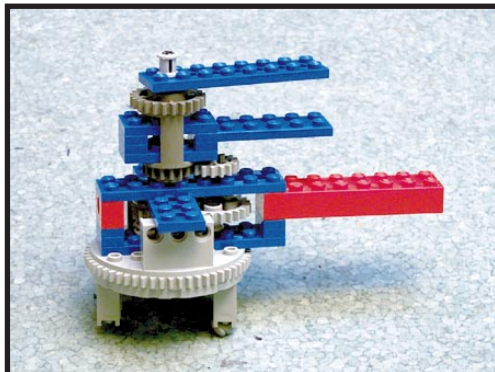


For motorized operation,  
leave gear block in place.

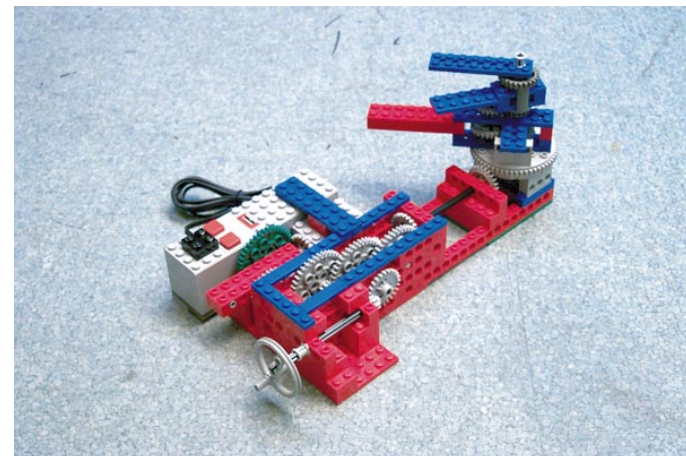


To disengage motor,  
remove gear block

# 15

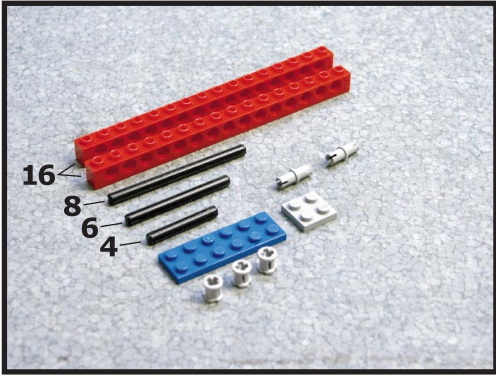


(From Step 6)

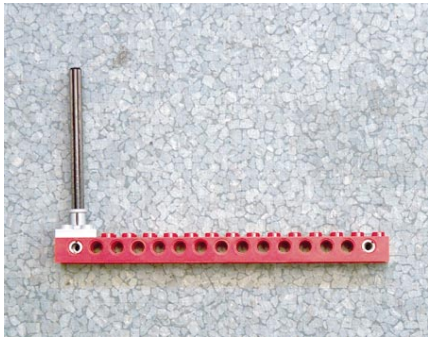




16



**a**

**b**

**C**

